



## TL8102 DIGITAL COMMUNICATION SYSTEM TRAINER



The Digital Communication Trainer is designed as a teaching aid in studying electronic communication, especially in Digital Communication Technology.

The trainer can be used in teaching fundamental, concepts theory, and demonstration or hands on of digital communication, so that the students could have a clear experimental views of the basic concepts, and familiarize with the operational aspects, of work in a digital communications laboratory.

This trainer includes the basic modules allowing students to experiment on ground-level telecommunications topics.

It is suitable used both in technical institution and universities courses.

### Module One: TL8102-01

#### Line Code Encoder

- Experiment 1: Unipolar and Bipolar NRZ Signal Encoder  
Type of Signal: TTL, Data Rate: 1 kbps ~ 4 kbps.
- Experiment 2: Unipolar and Bipolar RZ Signal Encoder  
Type of Signal: TTL, Data Rate: 1 kbps ~ 2.5 kbps, CLK: 2 kHz ~ 5 kHz.
- Experiment 3: AMI Signal Encoder  
Type of Signal: TTL, Data Rate: 50 bps ~ 250 bps, CLK: 100 Hz ~ 500 Hz.
- Experiment 4: Manchester Signal Encoder  
Type of Signal: TTL, Data Rate: 100 bps ~ 400 bps, CLK: 200 Hz ~ 800 Hz.



## TL8102 DIGITAL COMMUNICATION SYSTEM TRAINER

### Line Code Decoder

- Experiment 1: Unipolar and Bipolar NRZ Signal Decoder  
Type of Signal: TTL, Data Rate: 1 kbps ~ 4 kbps,
- Experiment 2: Unipolar and Bipolar RZ Signal Decoder  
Type of Signal: TTL, Data Rate: 1 kbps ~ 2.5 kbps, CLK: 2 kHz ~ 5 kHz.
- Experiment 3: AMI Signal Decoder  
Type of Signal: TTL, Data Rate: 50 bps ~ 250 bps, CLK: 100 Hz ~ 500 Hz.
- Experiment 4: Manchester Signal Decoder  
Type of Signal: TTL, Data Rate: 100 bps ~ 400 bps, CLK: 200 Hz ~ 800 Hz.

### Module Two: TL8102-02

#### PWM Modulator

- Experiment 1: uA741 Pulse Width Modulator  
Carrier Signal: 1.5 kHz ~ 2 kHz, Audio Signal: 500 Hz.
- Experiment 2: LM555 Pulse Width Modulator  
Carrier Signal: 5 kHz ~ 10 kHz, Audio Signal: 1 kHz.

#### PWM Demodulator

- Experiment 1: Pulse Width Demodulator  
Carrier Signal: 5 kHz ~ 6 kHz, Audio Signal: 500 Hz ~ 700 Hz.

### Module Three: TL8102-03

#### PCM Modulator

- Experiment 1: PCM Modulator  
Built-in Sample Frequency: 8 kHz, Built-in Operation Frequency: 2048kHz, Audio Signal: 100 Hz ~ 2kHz.

#### PCM Demodulator

- Experiment 1: PCM Demodulator  
Built-in Sample Frequency: 8 kHz, Built-in Operation Frequency: 2048kHz, Audio Signal: 100 Hz ~ 2 kHz.

### Module Four: TL8102-04

#### Delta Modulator

- Experiment 1: Delta Modulator  
Type of Sample Signal: TTL CLK, Sample Frequency: 32 kHz ~ 256 kHz, Audio Signal: 1 kHz ~ 3 kHz.

#### Delta Demodulator

- Experiment 1: Delta Demodulator  
Type of Sample Signal: TTL CLK, Sample Frequency: 32 kHz ~ 256 kHz, Audio Signal: 1 kHz ~ 3 kHz.

### Module Five: TL8102-05

#### Adaptive Delta Modulator

- Experiment 1: Adaptive Delta Modulator  
Type of Sample Signal: TTL CLK, Sample Frequency: 32 kHz ~ 128 kHz, Audio Signal: 500 Hz ~ 1 kHz.

#### Adaptive Delta Demodulator

- Experiment 1: Adaptive Delta Demodulator  
Type of Sample Signal: TTL CLK, Sample Frequency: 64 kHz ~ 256 kHz, Audio Signal: 500 Hz ~ 1 kHz.

### Module Six: TL8102-06

#### ASK Modulator

- Experiment 1: XR 2206 ASK Modulator  
Carrier Signal: 20 kHz, Data Rate: 1kbps.
- Experiment 2: MC 1496 ASK Modulator  
Carrier Signal: 20 kHz ~ 100 kHz, Data Rate: 2 kbps.

#### ASK Demodulator

- Experiment 1: Asynchronous ASK Demodulator ( I )  
(Using XR2206 as the modulated ASK signal)  
Carrier Signal: 20 kHz, Data Rate: 200bps ~ 1 kbps.
- Experiment 2: Asynchronous ASK Demodulator ( II )  
(Using MC1496 as the modulated ASK signal)  
Carrier Signal: 20 kHz, Data Rate: 200bps ~ 1 kbps.
- Experiment 3: Synchronous ASK Demodulator  
Carrier Signal: 100 kHz, Data Rate: 200bps ~ 2 kbps.



## TL8102 DIGITAL COMMUNICATION SYSTEM TRAINER

### Module Seven: TL8102-07

#### FSK Modulator

- Experiment 1: XR2206 FSK Modulator  
Data Rate: 200 bps ~ 400 bps.
- Experiment 2: LM566 FSK Modulator  
Data Rate: 200 bps ~ 400 bps.

#### FSK Demodulator

- Experiment 1: FSK Demodulator ( I )  
(Using XR2066 as the modulated FSK signal)  
Data Rate: 200 bps ~ 400 bps.
- Experiment 2: FSK Demodulator ( II )  
(Using LM566 as the modulated FSK signal)  
Data Rate: 200 bps ~ 400 bps.

### Courseware

- Student Workbook
- Instructor's Guide
- 2mm Connecting cables

### Optional Instruments to be used together with TL8102

- Function Generator and DC Power Supply Module (TL8001)
- 100MHz Digital Oscilloscope (UT2102CE)
- 1GHz Spectrum Analyzer (SA5011T)
- Digital Multimeter (UT71B)
- Module Frame Rack (TL8005)



Module Frame Rack (TL8005)

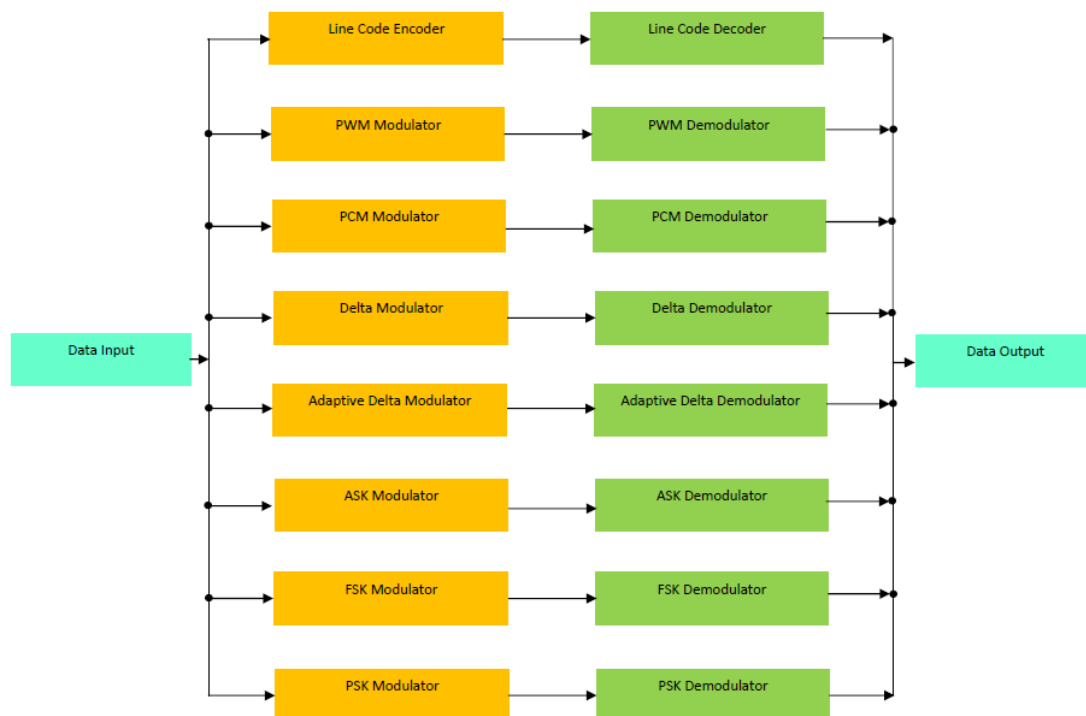
### Module Eight: TL8102-08

#### PSK Modulator

- Experiment 1: PSK Modulator  
Carrier Signal: 100 kHz, Data Rate: 200 bps.

#### PSK Demodulator

- Experiment 1: PSK Demodulator  
Carrier Signal: 100 kHz, Data Rate: 200 bps.



DIGITAL COMMUNICATION SYSTEM BLOCK DIAGRAM

Subject to change without notice